Notice No.5

Rules for the
Manufacture, Testing and Certification of Materials
July 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2018

Amendments to	**Effective date**	**IACS/IMO implementation (if applicable)**
Chapter 3, Section 1	1 July 2018	1 July 2018
Chapter 15, Section 4	1 July 2018	N/A

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Chapter 3
Rolled Steel Plates, Strip, Sections and Bars

■ *Section 1*
General requirements

1.4 Manufacture

(Part only shown)

1.4.4 Material may be supplied either as-rolled, normalised, normalising rolled, or thermomechanically controlled rolled. The following definitions apply:

(a) As-rolled (AR) refers to ~~rolling of steel at high temperature followed by air cooling~~ steel being cooled as it is rolled with no further heat treatment. The rolling and finishing temperatures are typically in the austenite recrystallisation region and above the normalising temperature. The strength and toughness properties of steel produced by this process are generally less than those of steel heat treated after rolling or steel produced by advanced processes.

(b) Normalising (N) refers to an additional heating cycle of rolled steel above the critical temperature, A_{c3}, and in the lower end of the austenite recrystallisation region for a specific period of time, followed by air cooling. The process improves the mechanical properties of as-rolled steel by refining the grain size and homogenising the microstructure.

(c) Normalising rolling (NR), also known as controlled rolling, is a rolling procedure in which the final deformation is carried out in the normalising temperature range, and subsequently cooled in air, resulting in a material condition generally equivalent to that obtained by normalising.

(f) Quenching and Tempering (QT) is a heat treatment process in which steel is heated to an appropriate temperature above the A_{c3}, held for a specific period of time, and then cooled with an appropriate coolant for the purpose of hardening the microstructure, followed by tempering, a process in which the steel is re-heated to an appropriate temperature, not higher than the A_{c1}, maintained at that temperature for a specific period of time to restore the toughness properties by improving the microstructure and reducing the residual stresses resulting from the quenching process.

1.5 Surface ~~Q~~quality of materials

1.5.1 ~~Surface and internal imperfections not prejudicial to the proper application of the steel are not, except by special agreement, to be grounds for rejection. Where necessary, suitable methods of non-destructive examination may be used for the detection of harmful surface and internal defects. The extent of this examination, together with an appropriate acceptance standard, is to be agreed between the purchaser, steelmaker and Surveyor and is to be included in the manufacturing specification.~~ The steel is to be free from surface defects prejudicial to the use of the material for the intended application. The finished material is to have a surface quality in accordance with a recognised standard such as EN 10163 parts 1, 2 and 3 or an equivalent standard accepted by LR, unless otherwise specified in this Section.

1.5.2 The responsibility for meeting the surface finish requirements rests with the manufacturer of the material, who is to take the necessary manufacturing precautions and is to inspect the products prior to delivery. If, during the subsequent processing operations, surface quality of the material is found to be defective, the materials shall be repaired or rejected.

1.5.3 For hot rolled plates, wide flats and sections, the surface quality inspection method shall be in accordance with recognised National or International Standards as agreed between the purchaser and the manufacturer, and accepted by LR. The surface inspection acceptance criteria are to comply with the following:

(a) Imperfections

Imperfections of a harmless nature, for example pitting, rolled-in scale, indentations, roll marks, scratches and grooves, regarded as being inherent in the manufacturing process, are permissible, provided the maximum permissible limits of Class A of EN 10163-2 or limits specified in a recognised equivalent standard accepted by LR, are not exceeded and the remaining plate or wide flat thickness remains within the average allowable minus thickness tolerance specified in *Ch 3, 1.7 Dimensional tolerances*. The surface area exhibiting the imperfections is not to exceed 15 per cent of the total subject area.

(b) Defects

Affected areas with imperfections with a depth exceeding the limits of Class A of EN 10163-2, or the maximum permissible limits specified in a recognised equivalent standard accepted by LR, shall be repaired.

Cracks, injurious surface flaws, shells (overlapping material with non-metallic inclusion), sand patches, laminations and sharp edged seams (elongated defects) visually evident on surface and/or edge of plate are considered defects which would impair the end use of the product and which require rejection or repair.

1.5.4 If agreed by the manufacturer and purchaser, steel can be ordered with higher standards of required surface finish than those shown in *Ch 3, 1.5 Surface quality of materials 1.5.3*.

1.5.5 The examination and acceptance standard of surface quality and condition requirement of sections, bars and tubulars is to be agreed between the purchaser and the steel maker, and accepted by LR. It then has to be included in the manufacturing specification.

1.6 Internal soundness

1.6.1 The steel is to be free from segregations and non-metallic inclusions prejudicial to the use of the material for the intended application.

1.6.2 Verification of internal soundness is the responsibility of the manufacturer. The acceptance of internal soundness by the LR Surveyor shall not absolve the manufacturer from this responsibility.

Existing sub-Sections 1.6, 1.7 and 1.8 have been renumbered 1.7, 1.8 and 1.9.

~~1.9~~ 1.10 Visual and non-destructive examination

Existing paragraph 1.9.1 has been renumbered 1.10.1.

~~1.9.2~~ 1.10.2 With the exception of 'Z' grade plate material (*see Ch 3, 8 Plates with specified through thickness properties*) and bars for offshore mooring cable (*see Ch 3, 9 Bars for welded chain cables*), the non-destructive examination of materials is not required for acceptance purposes~~, *see also Ch 3, 1.5 Quality of materials 1.5.1*~~. However, manufacturers are expected to employ suitable methods of non-destructive examination for the general maintenance of quality standards. If agreed by the manufacturer and purchaser that the plates and wide flats products are ordered with an ultrasonic examination requirement, then the examination is to be carried out in accordance with a recognised standard accepted by LR, which is then to be included in the manufacturing specification.

1.10.3 Verification of results of visual and non-destructive examination is the responsibility of the manufacturer. The acceptance of internal soundness by the LR Surveyor shall not absolve the manufacturer from this responsibility.

~~1.10~~ 1.11 Rectification of defects

(Part only shown)
~~1.10.1~~ 1.11.1 For materials intended for structural purposes as detailed in *Ch 3, 2 Normal strength steels for ship and other structural applications*, *Ch 3, 3 Higher strength steels for ship and other structural applications* and *Ch 3, 5 Steels for machinery fabrications*, surface defects may be removed by local grinding provided that:

(d) adjacent ground areas, lying within a distance of less than their average breadth to each other, are to be regarded as one single area,
(e) ground areas lying opposite each other on both surfaces shall not decrease the product thickness by values exceeding the limits as stated under *Ch 3, 1.11 Rectification of defects 1.11.1 (a)*,
~~(d)~~(f) the ground areas have smooth transitions to the surrounding surface.

(Part only shown)
~~1.10.2~~ 1.11.2 Surface defects which cannot be dealt with as in *Ch 3, 1.11~~0~~ Rectification of defects 1.11~~0~~.1* may be repaired by chipping or grinding followed by welding, subject to the Surveyor's consent and under his supervision, provided that:

(g) welding is carried out by an approved procedure and by competent operators using approved low hydrogen type electrodes and the repaired area is ground smooth to the correct nominal thickness,

Chapter 15
Corrosion Prevention

■ *Section 4*
Cathodic Protection (CP)

4.8 Cathodic protection in tanks

4.8.3 Aluminium and aluminium alloy anodes are permitted in tanks which can contain explosive or flammable vapour, or in ~~ballast~~ tanks adjacent to tanks which can contain explosive or flammable vapour, but only at locations where the potential energy of the anode does not exceed 275 J. The weight of the anode is to be taken as the weight at the time of ~~installation~~ fitting, including any inserts and fitting devices. The height of the anode is, in general, to be ~~taken as the distance~~ measured from the bottom of the tank to the centre of the anode. ~~but exception to this may be given where the anodes are located on wide horizontal surfaces from which they cannot fall~~. Where the anode is located on a horizontal surface (such as a bulkhead stringer) not less than 1 m wide, provided with an upstanding flange or face plate projecting not less than 75 mm above the horizontal surface, the height of the anode can be measured above that surface.

4.8.5 Magnesium or magnesium alloy anodes are ~~permitted only in tanks intended solely for water ballast, in which case~~ not permitted in tanks which can contain explosive or flammable vapour, or in tanks adjacent to tanks which can contain explosive or flammable vapour. Where permitted for other tanks, adequate venting must be provided.

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Published by Lloyd's Register Group Limited
Registered office (Reg. no. 08126909)
71 Fenchurch Street, London, EC3M 4BS
United Kingdom

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